Interpreting CAHSEE Scores

To adequately interpret English-language arts (ELA) and mathematics (Math) test scores across administrations of the California High School Exit Examination (CAHSEE), the following statistical concepts need to be understood:

- ✓ Standard Error of Measurement (SEM)
- ✓ Conditional Standard Error of Measurement (CSEM)
- ✓ Raw Score to Scale Score Conversion
- ✓ Weighting of Examination Portions

For each administration of the CAHSEE, these statistics may vary. Below you will find text describing each of the above statistical concepts and how they apply to the CAHSEE. In addition, for each administration (starting with March 2001), there is a link to information including: 1) CSEMs for ELA and Math, 2) Raw Score to Scale Score Conversions for Math, and 3) Raw to Scale Score Conversions for ELA. For administrations in which the item weightings vary, the alternate weighting scheme will also be described.

Standard Error of Measurement

As with every test score, a student's score on CAHSEE includes some uncertainty. While uncertainty can come from a variety of sources, the amount of uncertainty can be described by a statistic called the Standard Error of Measurement (SEM). Statisticians define the "error of measurement" as the difference between the score a student obtains on a test (an observed score) and the hypothetical "true score" that the same student would obtain if a test could measure the student's achievement level with perfect accuracy. Statistical theory indicates that a student will have an observed score within one SEM of his or her true score about 68 percent of the time and within two SEMs of his or her true score about 95 percent of the time.

Conditional Standard Error of Measurement

The SEM is not the same at all score levels. The Conditional Standard Error of Measurement (CSEM) is the SEM at a specific score level. CSEMs for scores near the top and bottom of the CAHSEE scale, for example, are typically larger than CSEMs near the middle of the scale around the passing score of 350. Stated simply, the scores in the middle of the scale are generally more accurate measures of student performance than the scores at the lower or higher ends of the scale. It is critical to have accuracy at the passing score because the CAHSEE is a high-stakes exam.

To illustrate the CSEM principle, consider the following example. If a student achieves a score of 410 on the ELA test and the CSEM for that score is 12 points, we would be about 68 percent confident that his or her true score lies between 422 and 398 (i.e., his or her score plus or minus 12 points). We would be 95 percent confident that the student's true score lies between 434 and 386, which is a band around his or her score equal to two CSEMs (i.e., his or her score plus or minus 24 points).

Raw Score to Scale Score Conversion

Students have multiple opportunities to take the CAHSEE until they pass the ELA and mathematics portions. When administering multiple forms of a test, there is a need for a "constant scale." This means that the passing score must represent essentially the same level of achievement on all forms of the CAHSEE. To maintain comparability of scores across multiple test forms, number correct or raw scores are converted to scale scores. The CAHSEE scale scores for ELA and Math range from 250 to 450, with 350 being the score needed to pass each portion of the exam. The raw score to scale score conversion reflects the relationship between difficulty of individual test items comprising each test form and the constant measure of achievement indicated by the reported scale scores. For different test forms, the expected number correct score for a given level of achievement may vary somewhat due to (usually small) differences in the average difficulty of the questions in one form compared to the average difficulty of questions in other test forms. This is why the conversion tables for each test administration will differ slightly in relating number correct scores to scale scores. The procedure of converting the raw scores to scale scores is called score equating.

Baseline Conversions

After each administration of the CAHSEE, a link to the score conversion table for that administration will be added to this web site. The March 2001 CAHSEE serves as the baseline to which all future forms will be equated. For example, the mathematics raw score of 44 items answered correctly on the March 2001 test converts to the 350 scale score that reflects the minimum passing score of 55 percent correct approved by the State Board of Education. The Mathematics conversion table for May 2001 shows that a raw score of 46 items correct converts to the 350 scale score. This means that a student needed to get two more items correct on the May 2001 exam to be equivalent to getting 44 items (or 55 percent) correct in March 2001.

The CAHSEE was designed to be an accurate measure of achievement in the score range from about 300 to 400 (350 being the passing score). This accuracy around the passing score is sufficient to equate test scores on one test form to another correctly and to reasonably interpret the “distance to passing.”

Weighting ELA Examination Portions

The HSEE Standards Panel recommended that the reading and writing sections of the ELA portion of the spring 2001 CAHSEE be assigned equal weights (fifty percent each) in the calculation of each student’s total ELA scale score. The Panel also recommended that the writing applications (essays) be weighted 30 percent and the multiple-choice items be weighted 70 percent of each student’s total ELA scale score. To accomplish this technically in terms of the raw to scale score conversion, the following procedures were used:

1. The weight of .7683 was calculated for the reading and writing multiple-choice items. The 82 multiple-choice item scores are multiplied by this weight: 82 x .7683 = 63.

2. The weight of 3.375 was calculated for the average of the two scores for each essay. The maximum score on each essay is four; therefore, the weight is multiplied by 8 (2 x 4): 3.375 x 8 = 27.

3. The weights were applied to the item raw scores.

4. The sum of the weighted multiple-choice and essay scores was rounded to the nearest whole number. The weighted raw scores are transformed to the ELA scale score.

The sum of steps 1 and 2 represent the range of the weighted ELA raw score, that is, 90. For both March and May 2001, a student needed a weighted ELA raw score of 54 to achieve a minimum passing score of 350. For March 2002, a student needed a weighted ELA raw score of 51 to achieve a minimum passing score of 351. Note that for March 2002, an ELA scale score of 350 was not possible. This can happen because not every scale score point is used. Over time, different conversion tables will equate different weighted ELA raw scores to the minimum passing CAHSEE scale score.

Removing Items from Scoring

For some administrations, one or more multiple-choice items may be removed from scoring. For ELA, multiple-choice items carry a different weight than essay items. Thus, if one or more ELA multiple-choice items are removed from scoring, the weight assigned to the multiple-choice item score is adjusted so the product of the weight and the score remains 63. For example, if one multiple-choice item is removed, the remaining 81 multiple-choice items are multiplied by .7778.

For mathematics, all 80 multiple-choice items count equally towards the total score. If it is necessary to remove one or more items, the maximum possible score will be reduced by the number of excluded questions, and the revised score will be equated to the CAHSEE scale (250-450).

Links

Click one of the links below to see the following tables for each administration: 1) CSEMs for ELA and Math, 2) Raw Score to Scale Score Conversions for Math, and 3) Raw to Scale Score Conversions for ELA. For administrations in which the item weightings vary, the alternate weighting scheme will also be described.

March 2001	March 2002	July 2002	November 2002
May 2001	May 2002	September 2002	January 2003
			March 2003
			May 2003